that the observations of Kamerer of Nürnberg (Camerarius) anticipated by two years the publication of Ray's "Historia Plantarum," I must refer him and any of your readers who are interested in the subject to Sachs's "Geschichte der Botanik."

Linnæus ("Amœnitates," vol. i. pp. 329, 330) thus sums up the relative merits of Millington, Grew, Ray, and Camerarius: "Thomas Millington, eques Anglus, Professor Savilianus, primus videtur, qui insigni cura in hanc veritatem eruendam incubuit, viamque aperuit experientissimo Grewio. Nehemias Grew, in anatome Plantarum, sexus diversitatem et fecundationem plantarum per farinam mascule scrutari conatus est; cujus *hypothesibus*, album addidit calculum temporis sui botanicus eximius Rajus. Rudolphus Jacobus Camerarius primus perspicue *demonstravit* sexum et generationem, quamvis non dubii fuit ipse expers de hac veritate, quod si moverant experimenta quæ fecerat in Cannabe."

Now as to Theophrastus. Your correspondent makes much of the "prolifick virtue" ascribed to the pollen-grains by Grew. No one, however, can have read the writings of the early Greek and Roman naturalists without having learned, that not only did they distinguish male and female flowers, but also ascribed a "prolific virtue" to the pollen. Without troubling your readers with a Greek quotation, let us hear what a commentator on Theophrastus says:—"Theophrastus ait, fructum in palma feminæ perdurare nunquam posse nisi florem maris cum pulvere super eam concusserint;" and again: "In palma maris et fœminæ coitus sit;" or again, Pliny: "Adeoque est veneris intellectus, ut coitus etiam excogitatus sit ab homine ex maribus, flore, et lanugine, interim vero tantum pulvere insperso feminis."

I hardly think your readers generally will agree with "A. B. C." in his opinion that "time, paper, and ink are wasted" in a discussion of a historical point of some interest.

Dec. 24 ALFRED W. BENNETT

Saw-fish Inhabiting Fresh Water

IN NATURE, vol. xiii. p. 107, Mr. Wood, of Manila, writes on "Saw-fish inhabiting fresh water," in the Laguna de Baij, Luzon, as on something curious and new. But this fact was known long ago; not only do sharks live in fresh water there, but also elsewhere on the globe. As one who mentions the saw-fish in the Laguna de Baij, I only name the famous de la Gironnière ("Aventures d'un Gentilhomme Breton," 1857). He says, p. 102: "Deux poissons de mer se sont acclimatés dans les eaux douces du lac: le *reguin* et la *scie*. Le premier est heureusement assez rare, mais le second est très abondant."

The species of saw-fish mentioned is *Pristis perrotetti*, a species of very wide distribution; it has been collected in the Atlantic (West Indies), in the Indian Ocean (Zambesi), in the China Sea (Borneo), &c.

When on Luzon in the year 1872, I succeeded in procuring a series of specimens on the spot, which I brought home; they are from two to three feet long, but I saw, myself, at the fish-market of St. Cruz a specimen of about twenty feet in length. Quantities are to be seen on every market day in St. Cruz, the flesh being very cheap on account of its bad and dry quality, and only the poor mountaineers like it as food.

I took some trouble to get those smaller specimens home, because I fancied that they might possibly differ from the marine specimens (Bay of Manila). But an accurate comparison showed no difference at all, and therefore the changed conditions seem to have had no influence on the external features of the species.

The saw-fishes are said to fight violently with the crocodiles, which occur in large quantities in the Laguna, and I do not doubt the fact.

A. B. MEYER

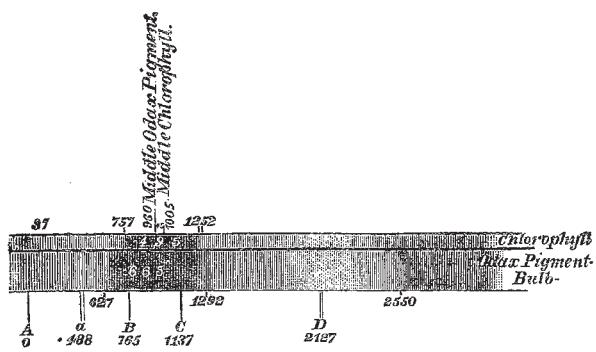
Dresden, Dec. 23

Spectrum of Fish-pigment

I HAVE lately observed the spectrum of a pigment-colour found under the scales in fins and tail, mouth and eyes, of a small smelt-like fish found in St. Vincent's Gulf, S.A. They are commonly known as the Weed fish, but Mr. Waterhouse, our Curator, informs me they are the *Odax radiatus*, *O. frenatus*, *O. Richardsonii*. These fish are perfect little gems for colour, being of a bright blue green (nearly blue) in *O. Richardsonii*, and about the eye most splendid; black centre, brilliant orange ring, outside of which is a most brilliant turquoise blue ring set in deep brown.

Finding this colouring matter stained paper, I examined the scales and fins by spectroscope, and noticed a deep band that appeared to correspond with the deep band of chlorophyll. I send a sketch of the respective spectra and a bulb and tube of the pigment in solution, which, with the pieces of tail and fins, I trust you will receive in good condition. I do not place much faith in it remaining clear and brilliant; the heat of the ship may possibly destroy or alter it. You will notice the solution is rather bluer than chlorophyll. This pigment is nitrogenous, is destroyed by heat, chlorine, acetic acid, alkalis, ammonia, and alcohol. It is soluble in water and sea-water. Sulphuric acid precipitates it with albumen of fish, but does not destroy colour. Light bleaches it. Its chemical properties are therefore distinct from those of chlorophyll.

I consider some interest attaches to this from the fact of the Parrot-fish (*Labrichths Richardsonii*) being marked with blue stripes containing the same colouring matter; also the scales and parts in Odax coloured orange give a green tint almost identical in shade to chlorophyll. This yellow or orange does not give



Spectra with kerosine flame on edge of Odax pigment and comparison with chlorophyll.

Dividing the Solar spectrum into 10,000 parts from A. bright kerosine flame on edge gives as above. The chlorophyll band is rather lighter in the centre; when solution is dilute it divides into two fine lines. Width of strong band, 495.

The Odax Pigment does not resolve into two lines. The centres of these two great bands Odax Chlorophyll are only forty-five apart. Width of band, 665; rather nebulous, especialy at end of greatest refraction. Some very faint bands occur each side of D, and continue to end of nebulosity to 2,550. The bulb gives the above figure. The tube a much narrower band, but centre coincides with bulb.

any band or interfere with the spectrum of the pigment, except so far as its mere colour and general absorption at blue end arising from such colour.

Now as chlorophyll has been said to be found in some infusoriæ, which I doubt, it is just possible that this or similar colouring matter is taken for it. I have been rather curious in examining animal greens in shells, and a native green silk we have here, also in the Emu egg-shell, but cannot find the slightest trace of chlorophyll band, and until I met with this I concluded no animal green yielded any band that could be mistaken for chlorophyll, and that therefore the spectroscope was an unerring test for distinguishing between vegetable and animal organisms. This spectrum of Odax pigment, which possibly I may find in other species of fish, Actiniadæ or Medusæ, many of which are beautifully coloured, is therefore so far of interest. I trust these remarks may be interesting and lead to some inquiry in this direction.

The dry pieces of fins and tail, also a piece of stained paper, will show well if mounted in balsam. If the colour is not deep enough, cross the layers one over the other until sufficient depth of shade is obtained. I use half-inch object glass in microscope except for scales and spots, when I use quarter, and shut out all other light; single scales then show the bands well.

GEORGE FRANCIS

Laboratory Institute, Adelaide, Oct. 9

Function of the Ocelli of Hymenopterous Insects

MY brother, Fritz Müller (Itajahy, Prov. St. Catharine, South Brazil), in his letters to me, has repeatedly started the question whether the size of the ocelli of hymenopterous insects is not dependent on their nocturnal habits. He supports this opinion by the following observations:—

1. *Apoica pallida*, one of the social wasps of Brazil, in the daytime rests quietly in its nest, which resembles the nest of our *Polistes gallica*, but is attached to the twig of a tree. During the evening it looks after flowers, and, whether sitting on them, and sucking their honey, or flying about in the moon-light, by its moonlike colour it is protected from its enemies. It differs from the allied species, which have diurnal habits, in the largeness of its ocelli.

2. One of the solitary Apidæ of Itajahy, belonging to the family of Andrenidæ (*Eophila matutina*, F. and H. Müller) has the singular habit of visiting flowers exclusively in the twilight of earliest morning, and is also provided with unusually large ocelli.

3. A species of *Dorylidæ*, probably belonging to the genus *Labidus*, found, Oct. 1875, by my brother's daughter Anna, late in the evening, flying towards the candle-light, is likewise remarkable for strikingly large ocelli. Concerning *Dorylus*, Gerstaecker says: Ocelli large, bladdered ("Ocellen gross, blasig"); and Westwood (Introduct. vol. ii., p. 216), "Mr. Burchell has informed me that the African species of Dorylus is nocturnal in its habits."

Can any of your readers give further information about the function of the ocelli? HERMANN MÜLLER

Lippstadt, Dec. 18

The House-fly

SOME months ago there were several notices in NATURE as to the death of house-flies, caused by a parasitic fungus. One instance only has come under my observation.

Certainly not later than the first week of last October I saw a fly standing dead on the outside of the pane of my window, surrounded with a small cloud of dust. After a day or two the fly fell off; but the curious part of the matter is that at this moment (Dec. 20), the dust is still on the window-pane. The spaces where the legs were are left sharp and clear, and the cloud, thickest close around them and under the place of the body, thins out gradually round to the distance of above an inch. Looked at through the window-glass (I cannot get at the outside), a pocket-lens resolves it into nothing more than coarser dust, presenting much the appearance of iron filings round the pole of a magnet, in the manner it diverges from the centre. Can any microscopist inform me, through NATURE, whether the fungus actually takes root on the glass, or by what means it has been able to maintain its adherence through the many drenchings of rain and snow to which the window has been exposed during this stormy season? M. E.

Mountfield, Sussex, Dec. 20

The true Nature of Lichens

The writer of the criticism on "Haeckel's History of Creation," in NATURE, vol. xiii. p. 121, will confer a favour on British Lichenologists if he will explain what he means by asserting that "the true nature of Lichens has been cleared up" of late years. W. LAUDER LINDSAY

[The reviewer referred to the investigations of Prof. Schwendener, of Basel: "Untersuchungen über den Flechtenthallus" (Nägeli's *Beiträge zur wiss. Botanik*, 1868), and "Eröterungen zur Gonidienfrage" (*Flora*, May, 1872). A translation of the latter paper appeared in the *Quarterly Journal of Microscopical Science* (vol. xiii. p. 235). See also "A *resumé* of recent views respecting the Nature of Lichens," by Mr. Archer (*ibid*, 1873, p. 217), and "Sexual Reproduction of Thallophytes," by Prof. Thiselton Dyer, in the same journal for last July, p. 296.—ED.]

The Boomerang

TRUSTWORTHY information respecting the performance of the boomerang is a *desideratum*. Reports from professed eye-witnesses as to its behaviour are frequently highly sensational and perplexing. It has been seen, so it is said, to strike an object with great violence and then to return to the hand of the projector! That its rapid rotation round the shortest axis passing through its centre of gravity should, as in the gyroscope, tend to make it keep its original plane of rotation, is clear. That its progressive force being expended before its rotatory force, it should tend to fall in the direction of the least resistance, *i.e.* to return on its path, need not be doubted. But striking an object with violence must, one would suppose, change its plane of rotation; and then there would be no disposition to return on its path. In the notice in last week's NATURE of "Artes Africanæ" it is stated that the African boomerang is thrown so as to rotate in a horizontal plane; in which case, except by accident, there would be no tendency to return to the thrower, a mode of action supposed to be proper to the boomerang. Many know the toy boomerang made of card-board, "V" shaped, with one limb shorter than the other, say four and two and-a-half inches respectively. When this toy is laid on the smooth cover of a book held at an inclination of about 60°, and when the shorter limb projecting just beyond the edge of the book is struck with a smart fillip of the finger so as to project it rotating rapidly at an upward angle of 60°, the toy will reach the further side of a room and return; but of course if it strikes anything its plane of rotation is changed and it falls irregularly. HENRY H. HIGGINS

OUR ASTRONOMICAL COLUMN

SMALL STAR WITH GREAT PROPER MOTION.—In vol. v. of the Madras Observations, Taylor mentions having observed in 1838 or 1839 a star of the 9th magnitude near to Brisbane 3458 (which appears not to have been found), the position of which, by three observations, is thus given for 1840:—R.A. 11h. 5m. 25·71s, N.P.D. 118° 59′ 12″·62.

Argelander twice observed a star of the same magnitude (Oeltzen, Nos. 11237-8) in zones 374 and 377, 1851 April 22 and 28, the mean place of which for 1850 is in R.A. 11h. 5m. 50·98s, N.P.D. 119° 1′ 52″·95. Assuming the identity of the stars observed by Taylor and Argelander, of which there can be little doubt, the comparison of positions for 1840 and 1850, taking the date of opposition of the star in 1838 as about the epoch of Taylor's observations, unfortunately not stated, shows an annual proper motion of − 0·293s in R.A., and of − 2″·74 in N.P.D., or 4″·72 in arc of great circle in the direction 305°·5. If this amount of proper motion is confirmed, it will be fourth in order of magnitude of the great proper motions of stars yet satisfactorily ascertained, and the list will then stand as follows:—

	Proper Motion in Arc of great Circle.	Direction of Motion.	Magnitude.
	″	°	
Groombridge 1830 ...	7·05 ...	145·0 ...	7
61 Cygni ...	5·21 ...	51·8 ...	5½
Lalande 21185 ...	4·75 ...	186·6 ...	7
Taylor's star ...	4·73 ...	305·5 ...	9
ϵ Indi ...	4·63 ...	124·8 ...	5½
Lalande 21258 ...	4·40 ...	282·4 ...	8½
40 Eridani ...	4·09 ...	212·0 ...	4½
μ Cassiopeæ ...	3·83 ...	115·3 ...	5½
α Centauri ...	3·81 ...	276·6 ...	1

Lalande 21185, is "Argelander's second star" of Prof. Winnecke, and No. 21258 is the star called "Argelander's third" by Dr. Krüger.

If Taylor's observations of the star of ninth magnitude were made in 1839, it should be third on the above list, but the precise amount of proper motion must remain for comparison of Argelander's position obtained in 1851, with future observations, it may be hoped early in the next year.

The N.P.D. of Brisbane 3458 mentioned above, agrees exactly with that of Lacaille 4641, but the R.A. differs 1m. 8s.; the magnitudes are the same.

THE SECOND COMET OF 1702.—The first comet of this year does not figure in our catalogues of cometary orbits, no observations properly so-called having been obtained. In Europe the tail only was seen by Maraldi and Bianchini at the end of February and beginning of March. The second comet of 1702 was observed at Berlin, Paris, and Rome, in the last ten days of April and beginning of May, and orbits have been calculated by Lacaille and Burckhardt; the latter reduced the observations anew, but it does not appear what data he had besides those